

We CLAIM:

1. A container comprising a flexible wall defining a variable-volume chamber, and a spout member attaching to said wall and providing a passage communicating with said variable-volume chamber, a cap member sealingly cooperating with said spout member to define a line of sealing interface and to close communication along said passage, and said cap member including a flange portion radially extending across and shielding the line of sealing interface of said cap member with said spout member.
2. The container of Claim 1 wherein said cap member further includes a skirt portion depending from said flange portion to extend axially along an outer surface of said spout member.
3. The container of Claim 1 wherein said skirt portion is separable from a remainder of said cap member.
4. The container of Claim 1 wherein said cap member further carries a dispensing spigot outwardly disposed on said cap member, and said dispensing spigot defining a dispensing passage communicating with said variable-volume chamber.
5. The container of Claim 1 wherein said cap member outwardly presents a boss providing for grasping of said cap member to apply an axially directed removing force to said cap member, whereby said boss may be grasped and said cap member may be removed axially from said spout member.
6. The container of Claim 1 wherein said cap member further defines an outwardly disposed sterilizable surface disposed annularly between a radially outer sealingly engageable surface of said cap member and a radially inner sealingly engageable surface of said cap member.
7. The container of Claim 3 wherein said flange portion includes an annular fine-dimension section, and said skirt portion is separable from said remainder of said cap member by fracture of said fine-dimension flange section.

8. The container of Claim 1 wherein each of said spout member and said cap member further includes cooperable locking structures, and said cap member is retained on said spout member when said cooperable locking structures are cooperatively engaged with one another.

9. The container of Claim 1 wherein said spout member defines an interior surface bounding said passage, and said cap member further includes a wiper structure sized and configured to pass along said passage in response to engagement or disengagement of said cap member upon said spout member, and said wiper structure further is engageable with
5 said interior surface of said passage during said passing of said wiper structure along said passage in order to wipe said interior surface.

10. The container of Claim 1 wherein said cap member defines with said spout member another line of sealing interface spaced inwardly along said passage, and an annular chamber interposed between said line of sealing interface and said another line of sealing interface.

11. The container of Claim 10 wherein said cap member and said spout member further cooperate with one another to sealingly retain a volume of pressurized gas in said annular chamber between said line of sealing interface and said another line of sealing interface.

12. The container of Claim 11 wherein said cap member further defines an internally disposed cavity for receiving an additional volume of pressurized gas, and a port communicating said cavity with said annular chamber.

13. The container of Claim 12 further including a flexible diaphragm portion having a face exposed to said pressurized gas, and said flexible diaphragm portion being outwardly convex when said pressurized gas acts on said face.

14. The container of Claim 12 wherein said flexible diaphragm portion has an inherent undistorted or unstrained configuration, and in said inherent configuration said flexible diaphragm portion is outwardly concave.

15. A container comprising a flexible wall defining a variable-volume chamber, and a spout member attaching to said wall and providing a passage communicating with said variable-volume chamber, a cap member sealingly cooperating with said spout member to define a first outer line of sealing interface and an axially spaced second inner line of sealing interface, and said cap member cooperating with said spout member to define an annular chamber interposed between said first line of sealing interface and said axially spaced second line of sealing interface.

16. The container of Claim 15 wherein said cap member and said spout member further cooperate with one another to sealingly retain a volume of pressurized gas in said annular chamber between said first line of sealing interface and said axially spaced second line of sealing interface.

17. The container of Claim 16 wherein said cap member further defines an internally disposed cavity for receiving an additional volume of pressurized gas, and a port communicating said cavity with said annular chamber.

18. A method of filling a container including a flexible wall defining a variable-volume chamber, a spout member attaching to said wall and providing a passage communicating with said variable-volume chamber, a cap member sealingly cooperating with said spout member to close communication along said passage, said method including steps of:

providing said cap member with a radially extending flange portion radially extending across and shielding a line of sealing interface of said cap member with said spout member;

providing a skirt portion depending from said flange portion to extend along an outer surface of said spout member; and

separating said cap member into a plug portion which sealingly closes said passage and a separate skirt portion disposed about said spout member.

19. The method of Claim 18 in which said separating step is accomplished by the step of cutting said skirt portion from said plug portion.

20. The method of Claim 18 in which said separating step is accomplished by the step of fracturing said skirt portion from said plug portion.

21. The method of Claim 18 in which said separating step is accomplished by the step of axially elongating said flange portion along said spout member to and beyond the point of breakage of said flange portion in order to separate said skirt portion from said plug portion.

22. A method of filling a sealed container having a flexible wall bounding a variable-volume chamber, and a spout member attaching to said wall and providing a passage communicating with said variable-volume chamber, and a cap member sealingly cooperating with said spout member to close communication along said passage, the cap member having
5 an annular outer sealingly engageable surface thereon, said method comprising steps of:

providing a filling head having a sealing ring adapted to sealingly engage the outer sealingly engageable surface of said cap member, and a sterilization chamber within the sealing ring;

engaging the filling head with the spout member so that the sealing ring of the filling
10 head sealingly engages the outer sealingly engageable surface of the cap member;

providing a sterilant in said sterilization chamber to sterilize at least a radially outer surface area portion of the cap member;

within the sterilized surface area portion of the cap member separating the cap member into a central plug portion and an annular skirt portion;

15 withdrawing the plug portion from said spout member; and

flowing flowable material along said passage into said variable-volume chamber.

23. The method of Claim 22 further including the steps of:

providing said cap member with an inner sealingly engageable surface within said annular outer sealingly engageable surface, and utilizing said inner sealingly engageable surface and said annular outer sealingly engageable surface to bound said sterilizable surface
5 area portion of said cap member to the shape of an annular area.

24. The method of Claim 23 further including the steps of: providing said filling head with an inner annular sealing ring adapted to sealingly engage with said inner sealingly engageable surface, and sealingly engaging said inner annular sealing ring with said inner sealingly engageable surface to limit contact of said sterilant to said annular sterilizable
5 surface area of said cap member.

25. The method of Claim 22 further including the steps of:
utilizing said cap member to cooperatively define with said spout member a first outer
line of sealing interface;
utilizing said cap member to cooperatively define with said spout member an axially
5 spaced second inner line of sealing interface; and
defining an annular chamber interposed between said first line of sealing interface and
said axially spaced second line of sealing interface.

26. The method of Claim 25 further including the step of: sealingly retaining a
volume of pressurized gas in said annular chamber between said first line of sealing interface
and said axially spaced second line of sealing interface.

27. The method of Claim 26 further including the steps of: defining within said
cap member a cavity for receiving an additional volume of pressurized gas, and providing a
port communicating said cavity with said annular chamber.

28. The method of Claim 20 including the steps of:
utilizing said cap member and said spout member to cooperatively define a circular
line of sealing interface,
providing said cap member with a flange portion extending radially across and
5 shielding said line of sealing interface, and
utilizing said flange portion to prevent flow of sterilant to said line of sealing interface
between said cap member and said spout member during sterilization of said sterilizable
surface area portion.

29. A filling apparatus for cooperating with a bag container having a flexible wall
bounding a variable-volume chamber, a spout member attaching to said wall and providing a
passage communicating between ambient and said variable-volume chamber, and a cap
member sealingly cooperating with said spout member to close communication through said
5 passage, said cap member including a radial flange portion extending radially across and
shielding a circular line of sealing interface between said spout member and said cap member,
and a skirt portion depending from said flange portion along an outer surface of said spout
member; said filling apparatus providing in combination;

grasping structure for holding said container, spout member, and cap member in a
10 selected position;

isolating structure for isolating a selected surface area portion of said cap member
from ambient, said selected surface area portion including at least a part of said flange
portion;

sterilizing flow path structure for delivering a sterilant to said selected surface area
15 portion of said cap member; and

cap separating structure for separating said cap member at said radially extending
flange portion into a radially inner plug member and a radially outer skirt portion;

plug portion pulling structure for removing said plug portion from sealing cooperation
with said spout member; and

20 material flow path structure for delivering a flowable material along said flow path
and along said passage into said variable-volume chamber.

30. The filling apparatus of Claim 29, further including said filling apparatus
providing pressure manifold structure for providing a pressurized fluid selectively into a
selected one of said bag container and said plug portion.

31. The filling apparatus of Claim 29, further including said filling apparatus
providing a filling head body movably carrying a filling valve stem, said filling valve stem
being selectively movable between a first position in which said material flow path structure
is closed to flow of material into said variable-volume chamber, and a second position in
5 which material flows from said material flow path structure into said variable-volume
chamber of said bag container, said filling head body and said filling valve stem
cooperatively defining in said first position of said filling valve stem, an annular chamber
which is sealingly isolated both from said flow path structure and from said variable volume
chamber, and a respective passage communicating with said annular chamber.

32. The filling apparatus of Claim 29, further including said filling apparatus
providing a cooling jacket structure surrounding at least a portion of said material flow path
structure.

33. A method filling a flexible bag container, said flexible bag container including
a pair of walls sealingly attached to one another so as to cooperatively define a chamber

therebetween, a spout member sealingly attached to one of said pair of walls at an opening therein, and said spout member defining a passage therethrough communicating with said chamber, said spout member carrying a cap member sealingly closing said spout member, said method comprising steps of:

providing said cap member with a wall portion spanning and closing said passage, a cylindrical portion sealingly received within said passage, a flange portion extending radially outwardly from said cylindrical portion, and a skirt portion depending from said flange portion along an outer surface of said spout member; and

separating said cap member within said flange portion into a plug portion including a central part of said wall portion and said cylindrical portion, and a separate skirt portion.

34. The method of Claim 33 further including the step of providing said cap member with a gas pressure chamber disposed within said cylindrical portion.

35. The method of Claim 33 further including the step of moving said separate skirt portion axially along said spout member away from said flange portion after separation of said skirt portion from said plug portion.

36. The method of Claim 33 further including the step of providing said cap member skirt portion with a cylindrical outer surface which is sealingly engageable.

37. The method of Claim 33 further including the step of providing said cap member with an outwardly extending central boss portion, and providing on said central boss portion a structure allowing the cap member to be grasped for withdrawal of said plug portion from said spout member.

38. The method of Claim 37 including the step of configuring said structure on said cap portion which allows grasping of said plug portion to also include a radially outwardly opening circumferential groove circumscribing said boss portion.

39. A flexible bag container comprising:

a pair of opposed flexible walls sealingly attached to one another so as to form an expansible chamber therebetween;

5 a tubular spout member attached to one of said pair of walls, said tubular spout member defining a through passage and defining an axis along the length of said through passage;

10 a cap member attached to the spout member, and said cap member including a plug portion sealingly disposed within said spout member to cooperatively define a circular line of sealing interface with said spout member, said cap member further including radially outwardly extending shield structure extending outwardly from said plug portion to overly said circular line of sealing interface.

40. A filling apparatus for cooperating with a bag container having a flexible wall bounding a variable-volume chamber, a spout member attaching to said wall and providing a passage communicating with said variable-volume chamber, and a cap member sealingly cooperating with said spout member to close communication through said passage, said filling apparatus comprising:

a filling head providing a material flow path for delivering a flowable material into said variable-volume chamber;

10 said filling head including a body movably carrying a filling valve stem selectively movable between a first position in which said material flow path is closed and a second position in which material flows from said material flow path into said variable-volume chamber;

15 said filling head body and said filling valve stem cooperatively defining in said first position of said filling valve stem an annular chamber which is sealingly isolated both from said material flow path and from said variable-volume chamber;

and a passage communicating with said annular chamber.

41. The filling apparatus of Claim 40, further including a respective flow path communicating with said passage for providing a pressurized fluid into said annular chamber.

42. The filling apparatus of Claim 40, further including a respective flow path communicating with said passage, and a device associated with said respective flow path for sensing a pressure level in said annular chamber.